

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

UNITED STATES DEPARTMENT OF AGRICULTURE
SYLLABUS 33

Contribution from the States Relations Service
A. C. TRUE, Director
In Cooperation with the Bureau of Plant Industry
W. A. TAYLOR, Chief

Washington, D. C.



February 26, 1918.

ILLUSTRATED LECTURE ON THE
CITY AND SUBURBAN VEGETABLE GARDEN

By

H. M. CONOLLY

Assistant Horticulturist in Agricultural Education,
States Relations Service

CONTENTS

	Page		Page
Value of City Gardening.....	1	Plants	8
Types of Gardening.....	2	Hotbeds and Cold Frames.....	8
Essentials for Successful Gardens.....	3	Establishing the Garden.....	10
Location and Soil.....	3	Management	15
Garden Plan	4	Conclusion	17
Seed	7	Appendix	18



U. S. DEPARTMENT OF AGRICULTURE,
STATES RELATIONS SERVICE.

A. C. TRUE, Director.

In cooperation with the Bureau of Plant Industry, W. A. Taylor, Chief.

SYLLABUS 33—ILLUSTRATED LECTURE ON THE CITY
AND SUBURBAN VEGETABLE GARDEN.¹

By H. M. CONOLLY, *Assistant Horticulturist in Agricultural Education, States
Relations Service.*

VALUE OF CITY GARDENING.

View.

A well-planned and carefully tended garden is one of the most pleasant and satisfying pieces of work in which the city or suburban family can utilize its spare time. If the garden soil is properly prepared and a little attention is given the garden as required the work need not become a burden on the members of the household.

1

2

Gardening the backyard and vacant lots of the city and suburban sections of our country is a patriotic endeavor. Patriotic because the production of any kind or quantity of food adds to the cities' food supply. The production of large quantities of food in the city and suburban sections is very advantageous because it utilizes the spare time labor of persons employed at other work, and it brings food to the family table with no drain on transportation lines, terminal and market facilities, or on store delivery service. The production of vegetables also enables the conservation of wheat, meat, etc.

3

Gardening gives pleasure and profit besides being patriotic. It gives pleasure not only in the work with growing plants, but in the producing of high-quality, crisp, fresh vegetables for the family table. It gives profit both in producing vegetables cheaper than they can be purchased and in lessening the use

4

5

¹ This syllabus has been prepared by cooperation between the Office of Horticultural and Pomological Investigations of the Bureau of Plant Industry, as regards subject matter, and J. M. Stedman, Farmers' Institute Specialist of the States Relations Service, as regards pedagogical form. It is designed to aid farmers' institute and other extension lecturers in presenting this subject before popular audiences. The syllabus is illustrated with 50 lantern slides. The numbers in the margins of the pages refer to the lantern slides as listed in the Appendix.

View.

of more expensive foods, like meats, etc. Gardening is no doubt profitable because of better health secured by the exercise in the open air and the use of more vegetables in the diet.

Gardening should be an important part of the city and suburban life because of the interest it adds to the lives of people little used to country surroundings. It is interesting to the young and old, and to women and girls as well as men and boys. There is no better way of keeping the boys off the street and out of mischief than giving them a plot of ground in which they can make a garden, the result to be their very own. Very young children can be interested in garden work. One five-year-old boy in Washington, D. C., the past season (1917) planted several kinds of seed himself and the plants grew to maturity. This youngster could be sent to the garden for any one of half a dozen different vegetables and return with the right one. In one season he learned to know a number of vegetables. A city golf enthusiast became interested in gardening that year and told some friends that he did not think he would play golf any more, for gardening was much more interesting. These are only two instances of thousands where gardening has become an interesting part of one's city life.

TYPES OF GARDENING.

There are a number of kinds of gardening that should receive attention in city and suburban sections. The backyard garden should undoubtedly receive first attention because it is the most closely associated with the home. If the backyard is cleaned up and planted to a garden it not only adds to the food supply of the family, but it improves to a great extent the surroundings of the home. The soil in the backyard can also be improved year after year until it is in a fine condition for all kinds of gardening work.

Vacant-lot gardens are an important item in city gardening because they bring a great number of vacant areas into some form of production and eliminate many undesirable conditions and eyesores. The large vacant areas may be taken over by some organization or company and divided up into a number of small plots which can be turned over to individuals for gardening work. In some instances a number of persons may work a garden, each one sharing in the labor, expense, and the results, but this type of community garden is not usually successful. An institution which can control the labor, expense, etc., can usually succeed in working a large area as a single garden.

School gardening is an important part of any city gardening work, because it interests the children in a worthy work, and will aid in keeping them off the streets and out of mischief. A plot of ground near the school may be used as a school garden or the children may have their gardens at home and conduct the work under supervision.

14

Garden clubs composed of boys and girls or even adults may conduct work with gardens. These clubs may be conducted in cooperation with the schools or not as conditions permit. The garden clubs when properly organized and supervised can produce wonderful results in any community. Members of a club will usually strive to make the best gardens possible, because they have the stimulus of healthy competition, and the personal visits of the garden supervisor.

15

Porch and window gardens are not an important class of gardens, but in some of the thickly populated sections of the larger cities this type of gardening is quite often practiced. Window boxes, boxes at ends of porches or on shed roofs, boxes on the edges of walks, or even on the small front lawn, and boxes and barrels on the roofs of tenement and apartment buildings are many ways of utilizing small spaces in the growing of plants. In the limited areas of boxes, barrels, etc., no large quantity of food can be produced, but the growing of plants can be made an interesting study besides adding something to the family table. Lettuce, parsley, radishes, onions, and tomatoes are some of the best crops for these limited spaces.

16

ESSENTIALS FOR SUCCESSFUL GARDENS.

Under the following headings suggestions are made for the planning and carrying out of a successful garden enterprise, for the proper preparation of the soil, and for the planting and growing of the various crops.

LOCATION AND SOIL.

The vegetable garden should be located as near the dwelling as is practicable. Where land at home is not available then a suitable vacant lot should be procured. The housewife is the one who will derive the greatest pleasure from the garden, and it should be possible for her to step out to the garden and in a few minutes procure the vegetables she desires. When the garden is situated some distance from the house the effort necessary to look after the vegetables becomes a burden, the

View.

garden is soon neglected, and the products are not utilized to the fullest extent. Very few vegetable crops will grow in shade, therefore care should be used not to locate the garden where it will be shaded by trees, buildings, etc. While a few leaf crops like lettuce, parsley, chard, etc., will grow under partial shade, most of the other crops will be failures. Shade for more than one-fourth of the day should be avoided. A spot at home where the garden can be located permanently is to be preferred, for then the soil can be improved steadily until it reaches a high state of fertility. A gentle slope is preferable to flat land, for it usually has better drainage, and if the slope is toward the south the soil warms up quickly in the spring, permitting early planting and early maturing of crops.

17

A rich sandy loam is the ideal soil for the garden, because it warms up early in the spring and can be more easily worked than the heavier types of soil. Almost any kind of soil, however, if it is not composed of bricks, mortar, stone, rubbish, etc., can be used for gardening if it is properly handled. Heavy clay soils may be improved greatly by adding large quantities of strawy manure in fall or by turning under green-manure crops. It is usually practicable to cover the clay soil with 2 or 3 inches of sifted coal ashes and then thoroughly incorporate the two by spading and hoeing. Sandy soils may be greatly improved for gardening purposes by growing green-manure crops on the land or by turning under liberal quantities of stable manure.

Good drainage is very important in the garden, and if the soil is not naturally well drained it should be drained artificially. Tile drains are the most satisfactory for the garden, but open ditches may be used.

GARDEN PLAN.

SIZE.

After a location for the garden has been settled upon, the next point to consider is the size of the garden that is needed. The area used will depend upon the amount of ground that is available, upon the fertility of the soil, the intensiveness of the cultural methods to be used, the size of the family, and the preferences for different kinds of vegetables. Where a family is to be supplied with a succession of fresh vegetables the average city backyard is none too large. Where plenty of vacant land is available the size of plot for gardening is governed a good deal upon the amount of time that can be devoted to the garden

18

work. One-fourth acre or even one-half acre plots are none too large if such crops as corn, potatoes, lima beans, squash, pumpkins, etc., are to be grown. On limited areas, 800 square feet or less, only such crops as lettuce, snap beans, onions, radishes, a few tomato plants, and other small plants that require little space, should be grown. The keynote to success in the garden is to have the soil as fertile as possible, so as to limit the garden to the smallest area that will produce sufficient high-quality vegetables with the least amount of labor. A small garden well cared for is far better than a larger garden which is partly neglected.

19

Wherever sufficient land is available a space equal in size and adjacent to the garden should be set aside for planting to a soil-improving crop. With such a plat available the garden can be rotated every year and the soil kept in a good state of fertility.

ARRANGEMENT.

The arrangement of the garden should be carefully worked out to suit the conditions of each particular garden. In the winter, when there is usually plenty of time available, it is a good plan to sit down with paper, pencil, and rule and draw out a plan of the garden. Mark on this plan the location for each vegetable and the amount, the succession, date of planting, etc. By making a plan and following it throughout the season the greatest success will be had with the garden.

20

While each garden must be planned to suit the conditions, there are a few general rules which apply to all gardens. The rows should run north and south to give the best distribution of sunlight on all sides of the plants, but where it is more convenient and where washing must be prevented the rows can run in other directions. All permanent vegetables like rhubarb, asparagus, herbs, etc., should be planted at one side of the garden where they will not be disturbed every year. Tall vegetables, like corn and pole beans, should be put at the north end of the garden or in a position where they will not shade the small vegetables. Wherever the land is available and horse cultivation can be used, allow sufficient space between rows for the larger cultivating tools. Also run the rows the long way of the garden to avoid excessive turning at the ends of the rows. For horse cultivation provide a 4 or 5 foot pathway along two sides of the garden at right angles to the rows, so that turning with the cultivator can be managed without injuring the vegetables. All vegetables that are to be planted early and that

21

View.

are to receive early cultivation at the same time should be grouped at one side of the garden to facilitate cultivation.

FENCES AND WINDBREAKS.

Every garden should be surrounded by a fence to keep out stray dogs, cats, chickens, and small children. In the prairie regions a windbreak or shelter belt is absolutely necessary to protect the garden, and in other regions, while the windbreak is not so necessary, it may protect the crops from damage by winds, and the protection from cold winds may lengthen the crop-growing season considerably. If buildings, a grove of trees, a row of evergreens, or a hedge is not available as a windbreak, a tight board fence may be erected for temporary use. This board fence answers the double purpose of a windbreak and a fence.

SUCCESSION OF CROPS.

22

23

To make a garden yield the maximum quantity of vegetables it is necessary that the land be occupied as much of the time as possible. In some sections three or more crops may be grown on the same land during the season, and care must be used in selecting the crops that are to follow the early-season crops. The same vegetable, one with the same characters, or one belonging to the same family which has been used for the first planting should not be used in the same place at the second planting. Cabbage, kale, mustard, brussels sprouts, or cauliflower should not follow each other, for the same insects and diseases affect all these plants; and for the same reason peppers, eggplant, and tomatoes should not follow each other. In many cases, especially in the more southern sections of the country, an early vegetable is harvested and, if no other vegetable is to be planted until fall, the ground may be planted with cowpeas or other leguminous crop which can be plowed under in preparing for the fall crop.

ROTATIONS.

The rotation of crops is very important in the garden, both in conserving plant food and in checking the spread of insects and diseases. Space which has been occupied by a diseased crop should not be replanted the following year with the same or a closely related crop. It is a good plan to rotate the entire garden every year with an equal-sized plat which has been planted to clover or cowpeas. If such an extra plat is not

available, the locations of the various vegetables may be changed each succeeding year. If root crops, such as turnips, parsnips, beets, carrots, etc., are followed by foliage crops like kale, cabbage, collards, lettuce, etc., or by crops like tomatoes, beans, melons, or peppers, this will tend to conserve the plant food in the soil and prevent heavy infestations of insects and plant diseases.

SEED.

As soon as the location for the garden is selected and a plan made showing the kinds of vegetables to be grown, and places for planting them, the question of varieties should be decided. A number of points should be considered in selecting the varieties of vegetables to grow, among them being the time of maturity, the adaptation of the variety to the conditions, and the quality of product the plant produces. Usually it is better to select only standard varieties that do well in the locality, but a few novelties may be tried in a small way. With the exception of tomatoes and corn it is often better to select a few varieties and plant these in succession than to procure a larger number of early and late varieties.

Vegetable seed should be purchased several weeks ahead of the time it is to be used, and it is advisable to procure the seed from reliable seedsmen only. A good plan is to procure several descriptive catalogues either from reliable local seedsmen or from other good seed houses. These catalogues should be secured in the winter, so that the selection of seed may be made at leisure moments and the order sent out early.

The quantity of seed to purchase will depend upon the preference for different vegetables and the size of the garden. For an average family one of the ordinary seedsman's packets will be enough of the smaller seeds, but several packets of corn, peas, and beans will be required.

Buy only first-class seed, for inferior seed will be expensive at any price.

Seed which has been left from preceding season should be tested by counting out 25 or 50 seeds of each variety, putting them between two sheets of moist cloth or blotting paper, and covering with two plates. By looking at the seed every day the promptness and percentage of germination can be ascertained. In a good grade of garden seed 80 to 85 per cent of the seed should germinate in five or six days. Seeds that send out strong sprouts in a few days have the vitality necessary to

View.

insure a good stand of plants, and this is an important item in garden work.

PLANTS.

To secure the best results from the garden it is very desirable to set hardy plants such as cabbage, lettuce, etc., in the open ground even before danger of frost is passed. Plants of tender crops like peppers, eggplant, tomatoes, etc., should not be set until all danger of frost is passed. These plants can be grown in a limited way in shallow boxes or flats set in a sunny window of the dwelling house. The soil for the seed boxes should be fine and mellow, and the seed should be planted in rows with a label to designate each variety or kind. As soon as the plants form three or four leaves they should be picked off into other boxes, the plants being set at least 2 inches apart each way. Where there is not sufficient space in the house for growing all the plants desired, it is possible to grow the seedlings inside and prick them off into a cold frame out of doors.

All seedlings should be transplanted at least once before they are ready to be set in the garden. This transplanting causes the plant to become stocky and to produce a mass of fine roots. In many cases the seedlings are transplanted from the seed flats into earthen pots or dirt bands. Plants from the pots or bands can be set in the garden without disturbing the roots, and the plants receive no check in their growth. By this means it is possible to have plants ready to set in the garden at any time when another crop is taken out. For example, as fast as early cabbage is cut tomato plants can be set in their places, and pepper plants may be set in the row as fast as the early lettuce is harvested, etc.

HOTBEDS AND COLD FRAMES.

A hotbed and a cold frame of some form are very necessary to secure the maximum benefits from the garden. Plants can be raised more satisfactorily and on a much larger scale with frames than with seed boxes set in the house window. The frames can also be used for maturing early crops and for carrying over crops into the winter.

A very serviceable frame for a hotbed or cold frame may be constructed similar to the one shown on the slide. Oak or cypress boards 1 inch thick may be used, but thicker material is more durable. A more permanent frame can be constructed by using concrete. A hotbed 6 feet by 6 feet will be sufficient

for the needs of most home gardens, and a cold frame of equal size will be found of great assistance in growing crops successfully.

MAKING A HOTBED.

Secure a quantity of fresh horse manure made up of about two parts of the solid excrement to about one part of litter. Pile in a heap under cover for a few days, so that it will heat, and turn it over a few times to mix it thoroughly. When mixed place the manure in a pile to a depth of 18 inches, keeping it well trampled while being placed. On top of this manure place the frame and pack manure tightly all around it. Place inside the frame 4 or 5 inches of rich soil and cover with glass sash. Window sash can often be used for this purpose. The bed should stand for several days, some ventilation being given meanwhile, so that the gases from the manure may escape. When the temperature of the bed has fallen to between 80° to 90° F., the seed may be planted.

Another very satisfactory method of constructing a hotbed is to dig a pit to a depth of 18 to 24 inches and in this pack the manure and place the frame over it. This method has the advantage of requiring less manure. In using either method it is a good plan in the fall to cover the ground where the hotbed is to be located with a layer of manure about a foot thick. This covering of manure will keep the soil soft and warm, which will be a great aid when the time comes to construct the hotbed.

A hotbed may often be constructed adjoining the house and a pipe from the house-heating system used to furnish heat for the bed.

MANAGEMENT OF A HOTBED.

When the temperature has reached the required degree the soil is raked until very fine and all strawy material and refuse removed. The seed is planted in rows 3 inches apart and to a depth of an eighth to a half inch, according to the size of the seed. A thin stick or a lath can be pressed into the soil to give the required depth and to mark the rows. The seed should be covered very lightly with soil.

As plants grow they should be watered often enough to keep the soil from drying out, but not enough to keep the soil water-soaked. Water should be applied in a fine spray, and this can be done by using a rose on the hose or a watering can. The watering should be done early in the day, so that the plants will have time to dry off before night.

View.

Plants should have plenty of fresh air, but should not receive a direct draft or air that is chilly enough to check their growth. The hotbed sash may be raised slightly in the morning after the air becomes warm, but it should be lowered again before it turns colder toward evening. The sash should be opened only on the side opposite from the direction of the wind. On a bright sunny day the sash may be raised several inches, but on a dull day only a very small opening should be given. Always give good ventilation after watering plants. When the plants get large and the weather becomes warm the sash is left off gradually for longer periods to harden the plants.

Such plants as are being grown for setting in the garden should be transplanted into the cold frame as soon as they are about 2 inches high and have three or four leaves. Plants which are to mature crops in the hotbed should be thinned out as soon as they begin to crowd in the row. The soil should be stirred several times and all weeds taken out as soon as they appear. A hand weeder is a useful tool for this purpose.

Radish, lettuce, onions, etc., can be produced very early in the spring in the hotbed. Tomato, cabbage, celery, cauliflower, eggplant, pepper, and kohlrabi plants should be started in the hotbed in order to have them ready for planting in early spring.

A cold frame usually is only a frame placed over a good portion of garden soil. No source of heat is supplied except what comes from the sun. A cold frame is used to protect tender plants during the early spring or late autumn. The management of a cold frame is very similar to that of a hotbed, both in regard to watering and in ventilating.

ESTABLISHING THE GARDEN.

FERTILIZING.

The soil used for growing vegetables should be very rich and well supplied with humus. To produce vegetables of high quality and in a short period of time it is necessary to have large amounts of readily available plant food. Well-rotted stable manure is probably the best fertilizer, because it supplies both the plant food and humus. Wherever it is possible to obtain sufficient manure it should be supplied at the rate of 1 to 2 pounds per square foot or a good wheelbarrow load or two to each square rod, depending on the character of the soil. If sufficient manure is not obtainable it can be supplemented by using commercial fertilizer. An application of 3 to 6 pounds per square rod of high-grade mixture

analyzing 8 to 10 per cent phosphoric acid, 2 to 4 per cent nitrogen, and 1 to 3 per cent potash will be satisfactory on many garden soils.

Prepared sheep manure is an excellent fertilizer if it can be obtained at a reasonable price. Nitrate of soda is often used to hasten the growth of some plants. The best method of using nitrate of soda is to dissolve a teaspoonful in a gallon of water and use the solution to water the plants. Do not sprinkle nitrate of soda water over the leaves of the plants, for concentrated solutions are apt to burn the leaves.

When coarse or strawy manure is used it should be applied and plowed under in the fall, but if the stable manure is well-rotted it may be applied as a top-dressing and plowed under in the spring. Commercial fertilizer may be applied broadcast over the land after spading and thoroughly mixed with the soil by hoeing and raking, or it may be applied under the row.

32

A compost heap will furnish plant food that is in a quickly available condition and also soil which can be used in the hot-bed, cold frame, seed flats, and to put under and around plants which require considerable quantities of nitrogen. Such plants as cucumbers, cantaloups, watermelons, squashes, etc., will be greatly benefited if good compost is used in the hill when the seed is planted.

A compost heap can be easily made. First select a place near the garden, but screened from view. Put down a layer of sods and over this place alternate layers of manure, sandy soil, and clay soil until the whole pile is several feet high. The whole compost pile should be cut down and turned several times during the season, and by the next spring the manure will be thoroughly decayed and mixed with the soil. In the more thickly populated sections of a city, compost heaps are not usually allowed, so compost or decayed manure will have to be hauled in from out of the city.

LIMING.

Lime added to the soil will help to break up the soil particles and will also correct any acid or sour condition. Lime is not a plant food but it aids in making plant food in the soil more available.

Lime may be applied to the soil in the form of burned lime, hydrated lime, or finely ground limestone. Finely ground limestone may be applied either in the fall or in the spring. Burned lime or hydrated lime should *not* be applied in connec-

View.

33

tion with stable manure because it liberates a great deal of the ammonia in the manure. The manure may be spread on the land and spaded or plowed under. The lime may be scattered over the spaded soil and worked in by hoeing and raking or by harrowing. If the manure is applied in the fall the lime may be applied in the spring.

Five to eight pounds per square rod of burned lime or hydrated lime will be a sufficient application, and may be repeated every three or four years.

Although a garden soil may be tested with litmus paper to see if it is in need of lime, a good plan for most gardeners is to use lime anyway. Lime is comparatively cheap and for the limited areas of most city gardens the expense would not be considerable.

PREPARING THE SOIL.

34

35

36

The garden soil should be thoroughly prepared. A deep seed bed (8 to 10 inches) with the soil loose and mellow to the full depth is very essential. Heavy lands should be plowed or spaded in the fall if there is no danger of washing, and re-plowed or dug up with a mattock in the spring. Land that it is not advisable to plow in the fall should be plowed as early in the spring as possible. If there is plenty of humus in the soil, or some green-manure crop is turned under, the soil will crumble, and a fine seed bed can be easily prepared. If the soil is heavy and lacking in humus it is inclined to stick together and bake, and it is a difficult matter to pulverize it sufficiently for gardening work. Care must be used to cover all sod and strawy material so they will quickly decay and not interfere with the garden operations.

Often the backyards or vacant lots selected for the gardens have been firmed by much tramping and the soil can not be put into proper condition without the expenditure of considerable labor. The task of digging up such soil for the first time is very arduous, but it does not pay to slight the work. Spading to a depth of 8 inches and loosening 2 inches below the spade depth is very essential. Fining the soil all the way is also necessary.

TOOLS.

37

38

A spade or spading fork, a hoe, a rake, a dibble or trowel, and a garden line are the essential tools required for the garden. There are a few more tools, however, which are very desirable for certain kinds of work. Some of these tools.

are a mattock, a garden hose or a watering can, a wheelbarrow, a shovel, hand weeder of some form, and a hand wheel cultivator. Some of the tools mentioned are shown in slides 37, 38, 39.

LAYING OFF.

It is a simple matter to take the plan which has been made of the garden and lay off the distance along two opposite sides of the garden and set a stake at each place. By stretching a garden line between stakes it is possible to secure straight rows which add attractiveness to the garden. Straight, long rows in a garden are usually the first points to be noticed by any garden judge.

SEEDING.

In a small vegetable garden the seed is usually sown by hand, but in larger areas a seed drill will do much better work and in much less time than if done by hand. The seed is usually sown much thicker than is required, so as to insure a stand. Later the plants are thinned, leaving only the strongest and best plants. All small seed is sown to a depth of a quarter to three-quarters of an inch, depending upon the soil and the season, while larger seed like corn, beans, peas, etc., are sown to a depth of 2 inches.

TIME OF PLANTING.

Garden crops may be divided into four groups, as follows:

Group 1. Those vegetables that may be planted some two weeks before the last killing frost. These include cabbage plants, radishes, collards, onion sets, early smooth peas, kale, lettuce seed in boxes, early potatoes, turnips, and mustard.

Group 2. Those that may be planted about the date of the last killing frost. These include beets, parsnips, carrots, lettuce, salsify, spinach, wrinkled peas, cauliflower, celery, onion seed, parsley, lettuce in open ground, chard, and Chinese cabbage.

Group 3. Those plants that can not be planted until all danger of frost is past. These include snap beans, sweet corn, okra, and tomato plants.

Group 4. Heat-loving plants that can not be safely planted until the ground is warm. Lima beans, pepper plants, eggplant, cucumbers, melons, squash, and sweet potatoes.

Most gardeners are interested in knowing the earliest date for planting the various crops, as earliness is much desired,

View.

40

41

and also the latest dates so they can plan for the fall garden. It has been found that the earliest safe dates for planting garden crops can be determined from the average dates of the last killing frost in spring, and the latest safe dates for planting can be determined by the average dates of the first killing frost in the fall.

The maps shown in slides 40 and 41 divide the continental portion of the United States with zones, with a difference of about two weeks in the average date of the last killing frost or first killing frost between zones. The average dates of the killing frost while a guide in planting can not be depended upon every year but are reasonably safe. There is a difference of two weeks within the zones themselves owing to differences in elevation, in latitude, and in proximity to bodies of water.

SETTING.

The soil where plants are to be set should be worked up fine to a depth of several inches to facilitate planting. The plants should be thoroughly watered an hour or 'so before removing them from the flats or frames, to insure the adherence of the earth to the roots. If the plants have not been transplanted into pots or dirt bands they should be removed with a ball of earth attached to the roots.

A cloudy day or just before nightfall is the best time to set out plants, though potted plants and plants in dirt bands may be set at any time with good results. The plants should set a trifle deeper than they were in the seed bed and the soil firmed around the plant from the bottom of the hole to the surface. A trowel or a dibbler can be used for making the holes to receive the plants. If water is to be used in setting the plants it should be poured about the plant when the hole is partially filled with soil. The moist earth is then covered with dry soil, which prevents the rapid evaporation of the moisture.

Cabbage and lettuce plants may be set in the open as soon as the ground can be worked in the spring, but many plants such as tomato, pepper, eggplant, etc., should not be set until the weather has become warm. Some time may be gained by setting the tender plants before danger of frost is over and then protecting them by covering with newspaper, tin cans, berry boxes, or plant covers. These covers may be put over the plants at night when frosts are likely to occur, and if partially removed in the morning they will shade the newly set plants.

MANAGEMENT.

CULTIVATION.

Thorough preparation of the seed bed and good seed properly planted are very essential for successful gardens; but unless the plants are properly cultivated during the season the garden will prove a failure. Cultivation is not entirely for the purpose of killing weeds, but has as its main object the conserving of soil moisture. Frequent shallow cultivation forms a soil mulch which prevents the loss of moisture, and the frequent stirring prevents the growth of weeds. The soil close around the plants should be kept fine and free from weeds the same as the spaces between the rows. If the cultivation is begun as soon as the plants show and is kept up at regular intervals throughout the season the work does not become burdensome. If it is given only occasionally the plants may suffer, and the work is arduous and unsatisfactory. Cultivate the land after every heavy rain, to break up the crust that has formed, and as needed to form a soil mulch.

42

If the garden has been laid out with long rows and a medium wide space between rows, the bulk of the cultivation may be very quickly and efficiently done with a hand cultivator. In many instances very efficient work may be done with the hoe, but the larger share of the work of cultivating can be performed much quicker with a hand cultivator.

43

IRRIGATION.

A good supply of water in the soil is necessary throughout the growing season. During long periods of hot, dry weather the supply of moisture in the soil becomes very low, and the plants are so checked in growth that they fail to produce any crop, or at best only a very poor crop. It is often possible to establish an irrigation system which will insure an abundance of water for the plants at a relatively small expense.

Several systems of irrigation are adapted to the garden. An overhead system is probably best. By one such system the water is applied by means of elevated pipes placed at regular intervals over the garden. Nozzles are set in these pipes every 2 feet, and the pressure on the water forces out a fine stream or mist. Water may also be applied to the garden crops by means of a hose, by running the water in furrows between rows or by running the water in tile placed under the soil. The chief factor that must be considered in any system of irrigation is a sufficient supply of water.

CONTROL OF INSECTS AND DISEASES.

44

There are a number of pests that injure garden crops, and all persons who attempt gardening should provide themselves with a good sprayer of some kind and a supply of arsenate of lead, a nicotine solution, copper sulphate, and rock lime. It is much easier to control the pests when they first appear than to check them after the plants are thoroughly infested.

The insects which trouble the garden crops may be grouped in two main classes, chewing insects and sucking insects. For the control of the first class arsenate of lead is generally used, applied as a fine spray which covers every part of the plant. The insects in eating any of the plant obtain sufficient poison to kill them. Some insects of this class are the potato "bug," cabbage worms, tomato worms, etc. The sucking insects can not be killed by poison because they do not eat the surface. They obtain food by sucking the sap from the plant and can be controlled only by applying a preparation which will kill by coming in contact with their bodies. Some form of nicotine solution or pyrethrum powder is generally used for the purpose. Plant lice belong to this class.

The diseases which trouble the vegetable crops can also be grouped into two classes, fungus diseases and bacterial diseases. The fungus diseases may be controlled by spraying with Bordeaux mixture. The bacterial diseases, so far as known, can not be controlled by spraying. Plants affected with tomato wilt, cantaloup wilt, etc., should be pulled and burned as soon as the disease is noticed, and these crops should not be planted on the same ground until several years later.

For specific information regarding the control of insects and diseases write to the State agricultural college or to the United States Department of Agriculture, Washington, D. C.

SPECIAL PRACTICES.

A great many crops are grown in the city garden and a number of them should be handled in a special way to give the best results. Cauliflower just as it is beginning to head should have the upper three or four leaves folded over and tied. This treatment bleaches the heads and makes them more tender. Tomatoes if trained up to stakes or on wires will give much better results than if the tomatoes lie on the ground. Pole beans can be trained on poles or on fences where these are convenient. Celery plants, when they get about a foot high, should have the stalks covered for a period of about 10 days.

45

46

47

Paper, boards, tile, dirt, etc., may be used for covering the celery, for only by this bleaching is it possible to secure the brittle, high-flavored stalks that are so much desired. Late in the autumn, before freezing weather begins, celery may be placed in trenches dug in the ground, and a supply of celery may thus be secured until late into the winter.

GATHERING VEGETABLES.

One of the greatest sources of pleasure in having a home garden is to obtain vegetables in just the right state of maturity; therefore, the crops must be watched closely and gathered at the right time. It is much better to gather snap beans every day and secure them when they are small and tender than to allow them to go unpicked for several days until they get large and stringy. Cauliflower should be cut before the head begins to open and cabbage before the head cracks open. Carrots are much better in quality when small than if they grow large and tough.

SURPLUS VEGETABLES.

Whenever a larger supply of vegetables is secured than is needed for immediate use they may be canned for use during the winter. Beans, peas, tomatoes, and a great number of other vegetables can be canned very easily, and they will aid in supplying the need for vegetables in the diet during the winter. A number of the root crops, such as beets, turnips, carrots, rutabagas, potatoes, etc., may be stored in the house cellar or an outdoor cellar or pit for use during the winter. Pumpkins, squash, and sweet potatoes will keep much better when stored in the attic than if stored in a cellar.

Read Farmers' Bulletins 879 for full details about the storage of vegetables from the home garden; 839 and 853 in regard to canning; and 841 about drying.

CONCLUSION.

In every vacant lot or backyard in our cities and towns, wherever the soil is suitable and sufficient sunlight can be secured, there should be a vegetable garden. It is possible to make these gardens one of the most interesting parts of the home surroundings, and also a paying investment for the utilization of the families' spare time.

APPENDIX.

LANTERN SLIDES.

1. A typical city backyard vegetable garden.
2. A productive city vacant lot garden.
3. A collection of vegetables gathered at one time from a home garden.
4. Fresh cantaloup at just the right stage of ripeness.
An example of what is possible in the home garden.
5. A basket of carrots in prime condition to use in a fresh state or to keep for winter use by canning, drying, or storing.
6. The 2½-year-old youngster shown in this picture has spent many hours in the garden with his father. He can name many of the matured crops and is getting much valuable experience at an early age.
7. A yard full of rubbish.
A little enthusiasm and labor will make a garden of this plot.
8. The same yard after the rubbish had been cleared away and a garden established.
9. Portion of a prize winning garden.
The soil in this garden had been improved every year over a period of five years. The crops show the value of good soil.
10. A vacant lot consisting of good soil which should be producing some thing city people could eat.
11. An example of an undersirable appearing vacant lot which is all too common in most of our city and suburban communities.
It should be put to work producing food.
12. A large area of land, in the outskirts of a city, which has been divided into a number of individual gardens.
Many old fields can be put into cultivation by making them into gardens.
13. Portion of a large area which is utilized as a single garden by an industrial school.
14. A portion of a large school in which each two pupils have a separate plot for their work.
15. This picture shows a 10-year-old boy in his club garden which produced \$9.05 worth of vegetables on a space of 272 square feet.
16. Two elderly gentlemen in this garden of very limited area by using kegs, barrels, boxes, etc., grew enough vegetables to supply three people over a period of several months. Enthusiasm and time are needed in this kind of garden work.
17. This shows a vacant lot after plowing.
Though the work of clearing off the stone and planting a garden here was considerable, still four women produced a plentiful supply of fresh vegetables for their respective families on this plot.
18. Large vacant lots like this one may be planted to crops that require plenty of room.
This plot is planted to Lima beans, sweet potatoes, tomatoes, navy beans and black-eyed peas.
19. Gardens of small area like this one should be planted to crops that require little space.
Snap beans, beets, carrots, onions, lettuce, radishes, and tomatoes are here shown.

- 20. A suggestive plan showing the location of crops in a vegetable garden.
- 21. This picture shows how long, straight rows of vegetables add attractiveness to the garden as well as lessen the labor of cultivation.
- 22. The snap beans shown in the foreground were the third crop of the season, being preceded by radish, snap beans, onions, and early sweet corn.

- 23. The same garden earlier in the season.

Radishes are shown between the onions, and the corn between the snap beans has not yet come up.

- 24. A plot of ground planted to cowpeas as a rotation to improve the soil.
- 25. A simple method for testing garden seed.
- 26. A seed flat that is useful for growing early plants indoors or under glass.
- 27. Plants just after transplanting and a few days later.

Notice the space between plants and the stocky appearance of the plants.

- 28. Transplanted and non-transplanted celery plants compared.

Note the advantages secured by transplanting.

- 29. A pot-grown tomato plant.

Notice the heavy growth of roots and the ball of earth which allows of the plant being set out at any time without checking its growth.

- 30. Cabbage plants well along in size when the old snap-bean plants were removed.

These plants had only been set out two weeks.

- 31. A comparatively cheap and satisfactory frame which may be used as a hotbed or a cold frame.
- 32. This boy has just finished spreading a heavy application of manure which will be turned under and left over winter.
- 33. This soil has been limed in very early spring and the lime will be thoroughly incorporated in the preparations for the garden.
- 34. Fall spading is being practiced by this member of a boy's garden club.
- 35. Digging up in the spring, soil that had been turned over in the fall.
- 36. The condition of heavy clay soil in the spring after being spaded and left in the rough over winter.

- 37. Some of the tools that are essential for garden work.

- 38. Some small hand tools that may prove very useful in the garden.

- 39. A wheel hoe which is a valuable addition to any garden.

- 40. A map showing zones based on the average date of the last killing frost in spring.

The time of planting for the various vegetables is determined for every section by the dates given on this map.

- 41. A map showing zones based on the average date of the first killing frost in the autumn.

The latest safe dates for planting vegetables in the autumn are based on this map.

- 42. The soil about these potatoes has been worked up fine as soon as the potato plants broke through the soil.
- 43. The work of laying off the rows and cultivating the plants has been done in this garden with a hand cultivator.
- 44. A type of compressed-air sprayer which is very useful in the home garden.
- 45. Tomatoes trained up on stakes and strings.
- 46. An excellent method for training up pole beans when a fence is not convenient.
- 47. Celery which has been covered with boards to bleach the stalks.
- 48. An inexpensive type of outdoor cellar which can be easily constructed and used for storing root crops where a house cellar is not available.

- 49.** Cross section of a hotbed pit which makes a suitable storage place for celery from the home garden.
- 50.** This backyard garden was the pride of one city family, and it brought into their home health and happiness as well as considerable income.

REFERENCES.

1. Okra: Its Culture and Uses. U. S. Dept. Agr., Farmers' Bul. 232.
2. Cucumbers. U. S. Dept. Agr., Farmers' Bul. 254.
3. Beans. U. S. Dept. Agr., Farmers' Bul. 289.
4. Onion Culture. U. S. Dept. Agr., Farmers' Bul. 354.
5. Cabbage. U. S. Dept. Agr., Farmers' Bul. 433.
6. Tomato-Growing in the South. U. S. Dept. Agr., Farmers' Bul. 642.
7. Home Canning by the One-Period Cold-Pack Method. U. S. Dept. Agr., Farmers' Bul. 839.
8. Home and Community Drying of Fruits and Vegetables. U. S. Dept. Agr., Farmers' Bul. 841.
9. Home Canning of Fruits and Vegetables. U. S. Dept. Agr., Farmers' Bul. 853.
10. Fresh Fruits and Vegetables As Conservers of other Staple Foods. U. S. Dept. Agr., Farmers' Bul. 871.
11. Asparagus. U. S. Dept. Agr., Farmers' Bul. 829.
12. Frames as a Factor in Truck Growing. U. S. Dept. Agr., Farmers' Bul. 460.
13. The Home Garden in the North. U. S. Dept. Agr., Farmers' Bul. 937.
14. The Home Garden in the South. U. S. Dept. Agr., Farmers' Bul. 934.
15. The Home Storage of Vegetables. U. S. Dept. Agr., Farmers' Bul. 879.
16. Control of Diseases and Insect Enemies of the Home Vegetable Garden. U. S. Dept. Agr., Farmers' Bul. 856.
17. Celery. U. S. Dept. Agr., Farmers' Bul. 282.